

Cost comparisons of leading brands of the HMG Co-A reductase inhibitors (statin) drug, Atorvastatin 40mg, available in an India town

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Abstract:

Background: Hyperlipidemias are recognized as one of the significant risk factors for the development of Coronary Artery Disease (CAD). Statins are the most potent lipid-lowering agents currently available that significantly lower the morbidity and mortality associated with CAD. Price disparity can lead to significant financial stress on the patients, especially when cost-related aspects are not paid heed to by the prescribing physician. This study was conducted to compare the cost of ten most commonly prescribed preparations of different brands of Atorvastatin forty milligrams, in Kurnool city.

Methods: The present study was undertaken during August 2018 To December 2018. Authors collected a strip of 10 tablets each of the ten leading brands of Atorvastatin forty milligrams. The prices of the piece of 10 tablets of each of the ten chosen brands were compared. Finally, the monthly cost and yearly cost of each of these ten different preparations were compared directly as well as using percentages. The data was collected, analyzed and presented in tabular forms and figures.

Results: The data of the cost of ten different brands of a single drug Atorvastatin forty milligram shows that the monthly fee and annual cost of the costliest among the ten brands of this drug is more than four times that of the cheapest brand, or in other words more than 400 per cent that of the most affordable brand.

Conclusion: The cost differences between the ten brands were significant that they can't be disregarded. India, with a substantial part of the population being susceptible to the cost of medications, the prescribing physician must select the preparation wisely. The most costly development of Atorvastatin can significantly add to the financial stress on the patient's expenditure. Thus, Pharmacoeconomic considerations must take a front seat while deciding to prescribe medicines, especially in a country like India.

Keywords: Statins drugs, Atorvastatin forty milligrams, Pharmacoeconomics, Monthly cost, Yearly cost.

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I. Introduction

HMG-CoA reductase inhibitors are the drug of choice for hypercholesterolemia and diseases about the cardiovascular system. These drugs are currently the most frequently used and best-selling prescription drug worldwide. Hyperlipidaemia is a significant risk factor for cardiovascular morbidity and mortality. It is the term used to denote raised serum levels of one or more of total cholesterol (TChol), low-density lipoprotein cholesterol (LDL-C), triglycerides (TGs), or both TChol and TG (combined Hyperlipidaemia)¹. Statins are the most effective and well-tolerated agents for dyslipidemia. These drugs are competitive inhibitors of HMG CoA reductase, an enzyme which catalyses the early, rate-limiting step in cholesterol biosynthesis. Inhibition of HMG CoA reductase enzyme leads to a significant reduction in Low-Density Lipoprotein Cholesterol (LDL-C) and thereby decreases the development of adverse cardiovascular events. Depending on their ability to lower LDL-C levels, there is an overwhelming of multiple brands of statins available in the Indian pharmaceutical market leading to wide variations in the price for the same drug. Some brands are very costly, while some generic drugs are available at little cost. Improper knowledge about the value of different brands of the same medication may lead to difficulties in prescribing the most cost-effective treatment regimen to the patient. In 1997 NPPA (National Pharmaceutical Pricing Authority) was established for ensuring availability and affordability of the drugs. The drug price control order (DPCO) 2013 is one such effort under NPPA. The government established

DPCO to cut down the cost of essential medicines². This study was undertaken to evaluate the cost differences in ten preparations of different brands of the drug, Atorvastatin forty milligrams.

II. Methods

The present study was undertaken during August 2018 To December 2018. The authors collected strips of statins ten tablets each of ten leading, different brands of Atorvastatin forty milligrams from the local market of an Indian town of Kurnool. The price paid was the M.R.P. (Maximum Retail Price). All ten strips were recently manufactured within the last three months.

This price was converted to the monthly cost and yearly cost of each brand preparation for a single patient, based on once a day dosing prescription. This data was analyzed and presented in the form of tables, figures, bar diagrams for better visualization.

Inclusion Criteria

1. All of the included drugs were available for oral intake.
2. Preparations containing only Atorvastatin forty milligrams were selected.

Exclusion Criteria

1. Fixed-dose combinations were not included.
2. Parenteral preparations not included.

III. Results

The present study was conducted in Kurnool district in Andhra Pradesh. The study was undertaken from August 2018 To December 2018. Preparations of Atorvastatin forty milligrams of ten leading brands were selected. Strips containing ten tablets of each Preparation were selected. The price paid was the MRP (Maximum Retail Price) as per the local market. All the preparations were manufactured recently. All the ten brand preparations were coded as A1, A2, A3, A4, A5, A6, A7, A8, A9 and A10 to maintain confidentiality. From the price of 10 tablets, the cost of a single pill was calculated for each brand preparation.

As represented in Table 1, the cost of the strip of ten tablets of cheapest brand preparation, i.e. brand A1 was 65 rupees while that of the costliest brand, i.e. brand A5, was 278 rupees. The costs of the strips of remaining eight brand preparations were 110 rupees, 128 rupees, 220 rupees, 171 rupees, 247 rupees, 99 rupees, 204 rupees, 222 rupees from brand preparations A2, A3, A4, A6, A7, A8, A9 and A10 respectively. Thus, a single tablet of brand A1 costs 6.5 rupees per pill, while that of brand A5 was 27.8 rupees. The cost of the single tablet for remaining eight brand preparations were 11 rupees, 12.8 rupees, 22 rupees, 17.1 rupees, 24.7 rupees, 9.9 rupees, 20.4 rupees, 22.2 for brand preparations A2, A3, A4, A6, A7, A8, A9 and A10 respectively.

As represented in Table 2, as well as presented in figure 1, the monthly cost of each of the ten brand pattern was preparations, based on a single tablet once daily dosing calculated. This was worked out by dividing the annual fee by 12 (whole months in one year).

Table 1: Showing the prices of ten different brands of Atorvastatin forty milligram

Brand Code	Price for 10 tab. (rupee)	Price of 1 tab. (rupees)
A1.	65	6.5
A2	110	11
A3	128	12.8
A4	220	22
A5	278	27.8
A6	171	17.1
A7	247	24.7
A8	99	9.9
A9	204	20.4
A10	222	22.2

Thus the monthly cost of the cheapest brand, brand A1 was 198 rupees. The monthly cost of the costliest one, i.e. Brand A5 was 846 rupees, which is almost more than four times the cheapest brand preparation. The monthly costs on a similar basis of the eight remaining brand preparations were 335 rupees, 389 rupees, 669 rupees, 520 rupees, 751 rupees, 301 rupees, 620 rupees, 675 rupees for A2, A3, A4, A6, A7, A8, A9 and A10 respectively.

Table 2: Showing the annual & monthly cost of Atorvastatin forty mg tablets to a single patient based on once-daily dosing.

Brand Code	Annual cost(rupee)	Monthly cost (rupee)
A1	2373	198
A2	4015	335
A3	4672	389
A4	8030	669
A5	10147	846
A6	6242	520
A7	9016	751
A8	3614	301
A9	7446	620
A10	8103	675

As represented in Table 2, as well as presented in figure 2, the annual cost of each of the ten brand pattern was preparations, based on a single tablet once daily dosing calculated. This was worked out by multiplying the value of the only tablet of each brand preparation by 365 (whole days in one year) and recorded as annual cost in rupees. Thus, the yearly cost of cheapest brand, brand A1 was 2373 rupees. The yearly cost of the costliest one, i.e. Brand A5 was 10147 rupees, which is almost more than four times the cheapest brand preparation. The yearly costs on a similar basis of the eight remaining brand preparations were viz A2, A3, A4, A6, A7, A8, A9 and A10 fall in between as far as the annual cost is concerned, costing 4015 rupees, 4672 rupees, 8030 rupees, 6242 rupees, 9016 rupees, 3614 rupees, 7446 rupees, 8103 rupees for A2, A3, A4, A6, A7, A8, A9 and A10 respectively.

Figure 1 Monthly Cost of the ten different brand preparations of Atorvastatin forty milligrams for a single patient

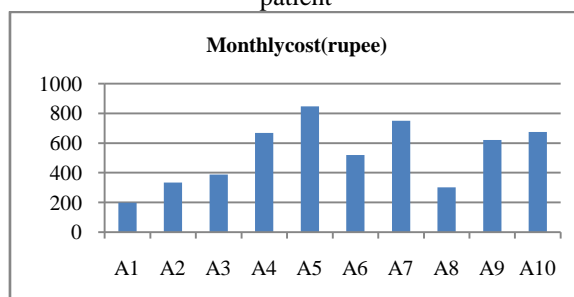
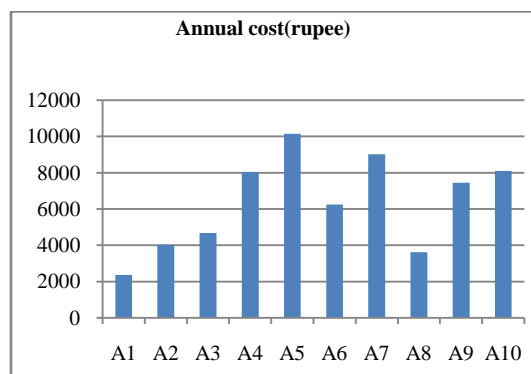


Table 3: Comparison of the annual costs of ten different brands of Atorvastatin forty in percentage.

Brand	Comparative cost (percent)
A1.	100
A2.	169
A3.	197
A4.	338
A5.	427
A6	263
A7	380
A8	152
A9	314
A10	342

Figure 2: Annual cost of the ten different brand preparations of Atorvastatin forty milligrams for a single patient.



Finally, as represented in Table 3 as well as presented in figure 3, the annual costs, based on a single tablet once-daily dosing schedule, were also calculated in percentages. Thus, the cost of the cheapest brand preparation, i.e. of brand A1, was considered as 100 %. Thus, the cost of the costliest brand preparation, i.e. brand A5, was 427 %. The percent cost of all remaining brand preparations were 169%, 197 %,338 %,263%,380%,152 %,314% and 342% for brands A2,A3,A4,A6,A7,A8 ,A9 and A10 respectively. Thus, the percent annual cost of the costliest brand preparation (Brand A5) is almost 427 % of that of the cheapest brand preparation (Brand A1).

Figure 3: Annual cost of the ten different brand preparations of Atorvastatin forty milligrams for a single patient.

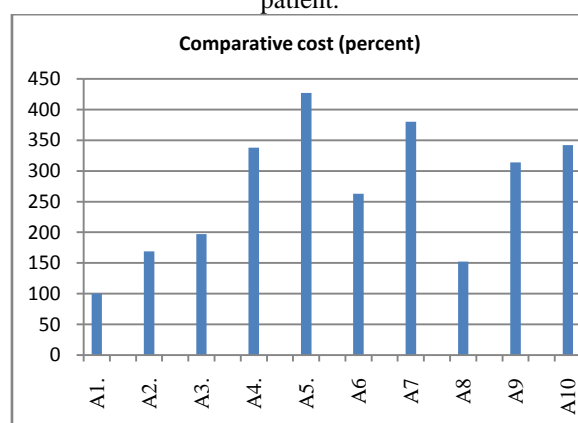


Table 1 shows, the prices for 10 tablets as well as single tablet of each of the ten brand preparations under the specified code names. Thus, it can be seen that the brand A1 provides the drug Atorvastatin forty milligram, the cheapest, costing 65 for 10 tablets, while costing 6.5 for a single tablet. In contrast brand A5 is the costliest among all ten, costing 278 rupees for 10 tablets and 27.8 rupees for single tablet. Amongst the remaining eight brands, the brand A2 costs 110 rupees, brand A3 costs 128 rupees, brand A4 costs 220 rupees , brand A6 costs 171 rupees ,brand A7 costs 247 rupees, brand A8 costs 99 rupees, brand A9 costs 204 rupees, brand A10 costs 222 rupees for 10 tablets respectively. while costing 11 rupees, 12.8 rupees, 22 rupees, 17.1 rupees,24.7 rupees,9.9 rupees,20.4 rupees,22.2 rupees for single tablet brand preparations of A2,A3,A4,A6,A7,A8 ,A9 and A10 respectively

IV. Discussion

Statins are the most commonly prescribed hypolipidemic drugs that characteristically decrease the incidence of adverse cardiovascular events. In India, more than one pharmaceutical company sell statins under different brand names along with the innovator company. Hence, a large number of formulations are available for the same drug at different prices. It is irrational to prescribe expensive drugs when cheaper drugs are available. A profit margin of pharmaceutical companies is hugely disparate. In 1995, the first Drug Price Control Order (DPCO-1995) was issued which included the prices of 76 drugs under the purview of price control for the benefit of patients, Government authorize NPPA to regulate prices of medicines which are included in the National List of Essential Medicines (NLEM) thus 348 essential medicines were included in the list in 2013^{2,3,4}. The National Pharmaceutical Pricing Authority (NPPA) regulates the cost of drugs marketed in India. It releases a National List of Essential Medicines (NLEM) from time to time that is included in the Drug Pricing Control Order (DPCO); latest being in 2015. This list contains 348 medications and 841 formulations.

Government is making every effort for ensuring the availability and affordability of medicines for all citizens of India. The order authorized the NPPA to regulate the medicine prices of not only NLEM but also medications which are not listed in NLEM (non-NLEM)⁵. But even after these efforts, there is a unique price variation, and some drug brand preparations still cost more than the other brands. Naturally, every pharmaceutical company aims to quote the price of the medicines they manufacture without jeopardizing their profit⁶. In some countries of the world, there are less stringent price control practices. This may be one of the reasons that the drug companies in those countries are more enthusiastic for drug invention and development⁷. But for the sake of the population at large, there must be some controlling system. This is even more significant in India, as there is no well-defined social security system. At the same time, the medical insurance coverage is inferior, and most of the health related expenses are to be borne by the consumers or the end-user themselves. A significant chunk of Indians is becoming financially stressed to a severe extent, every year, due to rising health care costs and a substantial number of patients die at home following discharge against medical advice from the intensive care units due to exuberant cost of the treatment⁸. In the present study, the monthly cost and annual cost of Atorvastatin forty milligrams were considered for a patient of single. It varies between 100 percent to 427 percent between the cheapest and the costliest brands amongst those brands selected for this study. Thus, while prescribing Atorvastatin forty milligrams to the patient, the Pharmacoeconomics of this drug be considered. Prescribing costlier preparations, without any compelling or justifiable reasons, for not so well to do patients might create a severe economic stress on the annual budget of many patients, especially in a country like India. Thus, every physician should learn the basic pharmacoeconomics of drugs, especially for chronic conditions like, ischemic heart disease, stroke, required for year together, and mostly for life. In such condition's polypharmacy, (prescribing of fine or more drugs to a patient concurrently), is quite common which might include other drugs such as antihypertensives, antidiabetics, hypolipidemic agents as per the merit of the case. It is a significant factor which should compel the prescribing physician even further to consider the cost-benefit of the drugs being used⁹.

V. Conclusion

A large number of brands of atorvastatin forty milligrams are available in the Indian market. Pricing of medicines is one of the deciding factors, and it has direct economic consequences on patients impacting the compliance to treatment. It is the moral responsibility of all medical professionals that they should evaluate the cost-effectiveness of drugs should before prescribing it to any patients.

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